

Virginia Department of Environmental Quality Comments on
The DRAFT Chesapeake Bay Total Maximum Daily Load,
United States Environmental Protection Agency, dated September 24, 2010

Docket Number EPA-R03-OW-2010-0736

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Section 6. Chesapeake Bay TMDL Development

On Page 6-15, the TMDL states that EPA “is seeking comment” on whether to include a “temporary reserve” in the final TMDL allocations.

Recommendation: DEQ does not support inclusion of a temporary reserve. TMDL allocations should not be set with an assumed margin of error based on proposed modifications to the Chesapeake Bay model.

6.2 Interpreting Model results

The Chesapeake Bay Water Quality/Estuary (WQE) Model calibration was conducted in a set of cells corresponding to monitoring stations. These calibration points for the most part were along the main axis of the bay and major tributaries. While the model has undergone a calibration and review process, a well calibrated model does not always match the monitored data. A study of any discrepancies is important particularly when evaluating a pass/fail metric of a water quality criterion. Despite requests by jurisdictions as early as 2008, the Chesapeake Bay Program still needs to develop a uniform set of objective criteria for evaluating model performance. These criteria would establish how well model results match observed data.

Previously, WQE model calibration cells were chosen as the most appropriate scale in the assessment of progress and attainment (pass/fail) of water quality criterion (EPA 2002). Unfortunately, current attainment assessment for the TMDL was developed in a number of segment/cells with little or no data or knowledge of model performance. In fact, model performance at criterion locations across the estuary has not been properly determined for any of the 92 impaired CB segments. This severely erodes confidence in model results or applications.

Furthermore, nonattainment diagnostics (pass/fail) for dissolved oxygen and chlorophyll in small tributaries appears to have applied questionable methods and assumptions. For

example, using regression lines to make predictions outside the range of values to assess attainment/non-attainment must be exercised with great caution. The confidence limits in such an extrapolation exercise were not adequately considered or reviewed for acceptance by the scientific community.

EPA acknowledges that chlorophyll-a is naturally highly variable and that “A dataset has not been identified from which there is confidence a biological reference curve can be derived (US EPA 2007b).” In addition, EPA concludes that the published phytoplankton index of biological integrity does not provide a suitable representation of the integrated seasonal biological community conditions needed to develop appropriate seasonal reference conditions for Chesapeake Bay chlorophyll-a criteria attainment assessments (EPA 2010). Despite these limitations and a small number of data points in the tidal James River data analyses, EPA concluded that the 10th percentile was adequate to apply their analysis to observed data. Unfortunately, a similar approach to the criteria attainment assessment of model output under various nutrient reduction scenarios was applied. This approach is highly undesirable and inappropriate given both the uncertainty of model performance as noted above and the lack of a thorough technical review.

The predicted changes in chlorophyll (1-2 ug/l seasonal average and 2-4% in terms of non-attainment) are well within the uncertainty of the model at calibration points. Experience has taught us that changes outside the calibration points are expected to be even greater. This uncertainty needs to be properly considered in using the model results in site-specific assessments.

Recommendation: EPA should develop a uniform set of criteria for evaluating model performance and attainment assessment of model output. These criteria should undergo scientific peer review.

Section 8. Watershed Implementation Plan Evaluation and Draft Backstop Allocations

CAFO/AFO

On page 8-15 and 8-16 of the draft TMDL, “moderate” level backstop allocations are described for Animal Feeding Operations (AFOs) and Concentrated Animal Feeding Operations (CAFOs) in Virginia. The “full treatment train” for AFO production areas is described on page 8-15 as containing waste management, barnyard runoff control, and mortality composting. Virginia agrees that in order to protect water quality, AFOs must implement practices that address management of animal waste produced, control of runoff, and mortality management. These three components can be addressed using a wide array of best management practices (BMPs). The terms “waste management” and “barnyard runoff control” are sufficiently broad to accommodate the varied site-specific practices that could be used; however, limiting mortality management to composting is overly restrictive. Other options such as rendering, landfilling, and incineration are also viable options that would produce an equivalent pollutant reduction.

Recommendation: Replace “mortality composting” with “mortality management.”

The draft TMDL also states on page 8-16 that “CAFO permitted facilities are assumed to have a control that all animals subject to CAFO permit conditions must receive feed management” and that EPA “assumes that all animals except dairies (e.g., poultry and swine) on AFOs that are not subject to CAFO permit conditions are assumed to receive feed management.”

Including feed management as a mandate is another example of an overly broad application of a BMP that may not be the appropriate tool in all circumstances. Site-specific conditions, such as variation in supplemental phosphorus sources, may make reductions in feed phosphorus impractical. In this case, mandating the goal is more appropriate than mandating a specific BMP. The goal in this case is reduction in the phosphorus land application rate where phosphorus is not needed. Any number of alternatives may be used to meet this goal. Virginia acknowledges that the TMDL states “jurisdictions may meet the WLA assumptions by...applying a different set of practices that would result in equivalent nutrient and sediment reductions;” however, the associated nutrient reduction of an alternative, equally effective BMP may not be as easily calculated by the model and therefore limits necessary flexibility for operations to determine the most effective suite of BMPs and for those BMPs to be accounted for in the model.

Recommendation: Remove the sentence on Page 8-16 that begins “EPA also assumes”

WASTEWATER – James River

The EPA backstop applies across-the-board allocations for significant municipal wastewater plants based on TN = 4 mg/l. This approach to setting wastewater allocations has particular adverse impacts involving three dischargers in the James River basin:

Hopewell Regional – influent is 80% industrial waste; due to unique wastewater characteristics of industrial facilities, a 5 mg/l concentration of nitrogen for a municipal treatment plant is equivalent to 12 mg/l for Hopewell, and 3 mg/l for municipal treatment plant is equivalent to 8 mg/l for Hopewell.

Recommendation for Hopewell Allocation: Base the TMDL WLA on 10 mg/l [which is equivalent to 4 mg/l at a POTW]; results in a WLA of 1,522,780 lbs/yr., which is a 913,668 lbs/yr increase over the EPA backstop.

Richmond/Lynchburg – CSO Communities – EPA plans to base WLAs on “full” design capacity of Richmond POTW (75 MGD) and a separate CSO WLA; this differs from VA approach of using dry weather flow capacity of POTW (45 MGD) and separate WLA for CS – overflows and CS – captured. EPA’s backstop only provides WLAs for Richmond based on a POTW flow of 45 MGD and the VA CSO proposed WLAs [if delivery factors are set to 1.0]. With the approach proposed in the TMDL, during dry years the backstop

WLAs are too high, effectively taking allocation away from other sources, and in wet years it is not clear whether the implementation approach EPA contemplates with their backstop allocation will adversely impact local water quality since it may result in less CSO treated by the treatment plant. The current Virginia implementation approach for CSOs used over the past 25 years is superior to the approach proposed by EPA and protects local water quality.

Recommendation for Richmond/Lynchburg: Base the TMDL allocations for Richmond and Lynchburg on the current Virginia implementation approach.

WASTEWATER – Potomac Basin

The nitrogen allocation in the WIP for Upper Occoquan Sewage Authority (UOSA) was set at current loads to protect the Occoquan reservoir, the drinking water source for over 1 million people. Nitrate-nitrogen discharged from the UOSA facility is needed to prevent the reservoir from going anaerobic, thereby releasing phosphorus and ammonia-nitrogen from sediments, and fueling algae blooms.

The EPA backstop set the UOSA allocation at 657,841 lbs/yr, exactly one-half of their existing Watershed General Permit allocation that is needed to protect the reservoir. Due to natural processes in the reservoir, the UOSA delivered backstop WLA is 24% of discharged, or 156,880 lbs/yr entering the tidal Potomac River.

In the submitted WIP, of the 39 wastewater treatment plants in the Shenandoah-Potomac basin, 25 received a WLA based on TN = 4 mg/l, 13 based on TN = 3 mg/l, and UOSA based on TN = 8 mg/l.

For the 13 facilities that have a WLA based on TN = 3 mg/l, their total allocations amount to 635,000 lbs/yr below a 4 mg/l based allocation. This more than exceeds the additional delivered load [156,880 lbs/yr] that is needed to set the UOSA WLA so it remains protective of the Occoquan reservoir.

Recommendation: Set the UOSA WLA at their current allocation of 1,315,683 lbs/yr (315,764 lbs/yr delivered).

AGRICULTURE – James River

The EPA backstop allocation for the James River does not call for any reduction in nitrogen loads within the agriculture sector from 2009 progress. For the other VA basins, the backstop calls for decreased allocations from 2009, ranging from 18 to 39% among the basins.

Recommendation: Set allocations that establish reductions for the agricultural sector.

TSS – James River

The backstop sediment allocation for the James River basin is more stringent than the criteria EPA used for other river basins in the Bay watershed. EPA determined that the sediment allocations should be based upon the level of nutrient reductions that are needed to meet the dissolved oxygen criteria. However, in the James basin the sediment allocation is based upon the nutrient reduction EPA believes is needed to meet the chlorophyll criteria, which is a greater nutrient reduction than would be needed to meet the dissolved oxygen criteria. The Commonwealth questions the scientific basis for establishing a sediment allocation in the James basin using an approach that differs from all other basins in the watershed.

Recommendation: Calculate the TMDL load for TSS in the James River based on nutrient reductions necessary to achieve dissolved oxygen standards.

TSS – All Basins

The current Virginia TSS load is estimated at 3.229 billion pounds per year; of that amount about 0.8% is estimated from wastewater (approximately 25 Million Pounds per Year).

The EPA backstop sets the TSS WLA for wastewater based on 5 mg/l. This approach results in a significant reduction from the submitted Virginia WLA which is based on 30 mg/l; A number of industrial facilities have demonstrated that even 30 mg/l is too low for their wastewater and current permit limits, and that meeting 5 mg/l concentration is not possible. Applying a backstop for total suspended solids discharged by significant wastewater facilities is unwarranted given their “de minimis” contribution compared to the vastly higher nonpoint source loads of TSS.

In addition, the EPA backstop sets WLAs for facilities below the fall line in four VA river basins using a delivery factor below 1.0, usually around 0.65, whereas the nutrient allocations for these facilities use a delivery factor of 1.0. The exception is in the Rappahannock basin where the TSS WLAs for facilities below the fall line are set using a delivery factor of 1.0. This is an apparent anomaly in the Watershed Model that needs further explanation.

Beside the concern about driving allocations down to a level that is disruptive and/or unattainable for the wastewater facilities, the EPA backstop also undermines the VA trading program since facilities desiring to purchase nutrient credits will then be over their TSS allocation.

Recommendation: Set WLAs for wastewater facilities at a reasonable level that reflects the minimal, if any, relationship between solids discharged from wastewater facilities and attainment of the water clarity/SAV criteria. DEQ is working to identify the specific WLAs that are reasonable for industrial facilities and plans to continue using 30 mg/l for POTWs. Since the EPA backstop TSS allocation for VA is about 222 MPY below the August 15 TSS allocation, it appears there is sufficient allocation available to provide a reasonable TSS allocation to the wastewater sector.

Onsite/Septic

The EPA backstop appears to set allocations for this sector at approximately 2009 levels in the James, Potomac and York basins; however, in the E. Shore and Rappahannock the allocations appear to reflect E3 levels.

Recommendation: The final VA WIP will reflect allocations that should be used in the TMDL for this sector.

Section 9 Chesapeake Bay TMDLs

As described in Virginia's draft WIP (submitted September 3, 2010), it is clear that the draft nutrient allocations for the James River basin published by EPA on July 1, 2010 are significantly more stringent than the levels supported by EPA in 2005 when the Virginia State Water Control Board adopted both the chlorophyll standards for the tidal James River and the nutrient allocations for the significant wastewater dischargers needed to meet those new standards. The Code of Virginia calls upon the Board to give due consideration to the economic and social costs and benefits which can reasonably be expected as a result of the standards they adopt. Given this development, reconsideration of these standards is warranted to ensure they reflect the most recent scientific information, monitoring data and modeling procedures.

Recommendation: The final TMDL needs to allow for re-evaluation of the chlorophyll standards prior to full regulatory application of the nutrient allocations associated with EPA's chlorophyll-based James River basin allocations.

Section 10 TMDL Development and Adaptive Management

The Commonwealth's existing Chesapeake Bay Nutrient Credit Exchange program allows trading among wastewater treatment facilities located within the same river basin, with one minor exception. Dischargers on VA's Eastern Shore may secure credits from plants located in the Shenandoah-Potomac and Rappahannock basins. The Bay TMDL is structured with 39 Virginia segment-sheds assigned separate TMDL equations for nitrogen and phosphorus. EPA's draft TMDL document does not explicitly acknowledge that dischargers within the same river basin, but are located within different segment-sheds in that river basin are allowed to exchange nutrients. Although the current TMDL wording expresses EPA's general support for trading, there should be no possibility that EPA or other stakeholders could misinterpret such general language as not allowing trading across different segment-sheds within the same river basin.

Recommendation: The final TMDL needs to explicitly acknowledge EPA's support for nutrient trading among Virginia wastewater dischargers located in different segment-sheds, but within the same river basin, with the one exception for the VA Eastern Shore noted above.

Appendix Q, Tables Q-1 and Q – 2

Industrial Stormwater VPDES Permit Aggregate Allocation

The TMDL Appendix Q-1 and Q-2 should clarify that industrial stormwater VPDES permit discharges are included in the Source “Stormwater-MS4”.

Aggregate loadings for industrial stormwater VPDES permits should be included in Appendix Q as part of the “Stormwater-MS4” for each segment. DEQ previously submitted an updated spreadsheet that added 12 facilities and replaced EPA contractor Tetra Tech “estimated acres” with the area information found in the individual permit registration statements to the extent such information was available.

Wastewater

The TMDL Appendix Q-1 and Q-2 will need to be revised based upon the updated model input deck that DEQ will provide to EPA by November 12th. The submission will include corrected information from the September 2 submission.